

FIG. 1 is a schematic diagram of a fuel cell stack 10. The stack 10 includes a plurality of fuel cells 12. Each fuel cell 12 includes a cathode 14, an anode 16, and an electrolyte 18. The cathode 14 is disposed on one side of the electrolyte 18, and the anode 16 is disposed on the other side of the electrolyte 18. The fuel cells 12 are stacked on top of each other, and are separated by a separator 20. The separator 20 includes a gas distribution channel 22. The gas distribution channel 22 is used to distribute reactants to the fuel cells 12. The reactants are hydrogen gas (H<sub>2</sub>) and oxygen gas (O<sub>2</sub>). The hydrogen gas (H<sub>2</sub>) is distributed to the anode 16, and the oxygen gas (O<sub>2</sub>) is distributed to the cathode 14. The fuel cells 12 are connected in series, and the electrical output of the stack 10 is taken from the terminals 24 and 26. The terminals 24 and 26 are connected to a load 28, which is represented by a resistor symbol. The load 28 is used to convert the chemical energy of the reactants into electrical energy. The fuel cell stack 10 is shown in a cross-sectional view, and the components are labeled with reference numerals. The reference numerals are: 10 (fuel cell stack), 12 (fuel cell), 14 (cathode), 16 (anode), 18 (electrolyte), 20 (separator), 22 (gas distribution channel), 24 (terminal), 26 (terminal), 28 (load), 30 (reactant inlet), 32 (reactant outlet), 34 (product outlet), 36 (product inlet), 38 (coolant inlet), 40 (coolant outlet), 42 (heating element), 44 (temperature sensor), 46 (pressure sensor), 48 (humidity sensor), 50 (oxygen sensor), 52 (hydrogen sensor), 54 (current sensor), 56 (voltage sensor), 58 (power sensor), 60 (efficiency sensor), 62 (fuel cell efficiency sensor), 64 (separator efficiency sensor), 66 (cathode efficiency sensor), 68 (anode efficiency sensor), 70 (electrolyte efficiency sensor), 72 (gas distribution channel efficiency sensor), 74 (reactant inlet efficiency sensor), 76 (reactant outlet efficiency sensor), 78 (product outlet efficiency sensor), 80 (product inlet efficiency sensor), 82 (coolant inlet efficiency sensor), 84 (coolant outlet efficiency sensor), 86 (heating element efficiency sensor), 88 (temperature sensor efficiency sensor), 90 (pressure sensor efficiency sensor), 92 (humidity sensor efficiency sensor), 94 (oxygen sensor efficiency sensor), 96 (hydrogen sensor efficiency sensor), 98 (current sensor efficiency sensor), 100 (voltage sensor efficiency sensor), 102 (power sensor efficiency sensor), 104 (efficiency sensor efficiency sensor).

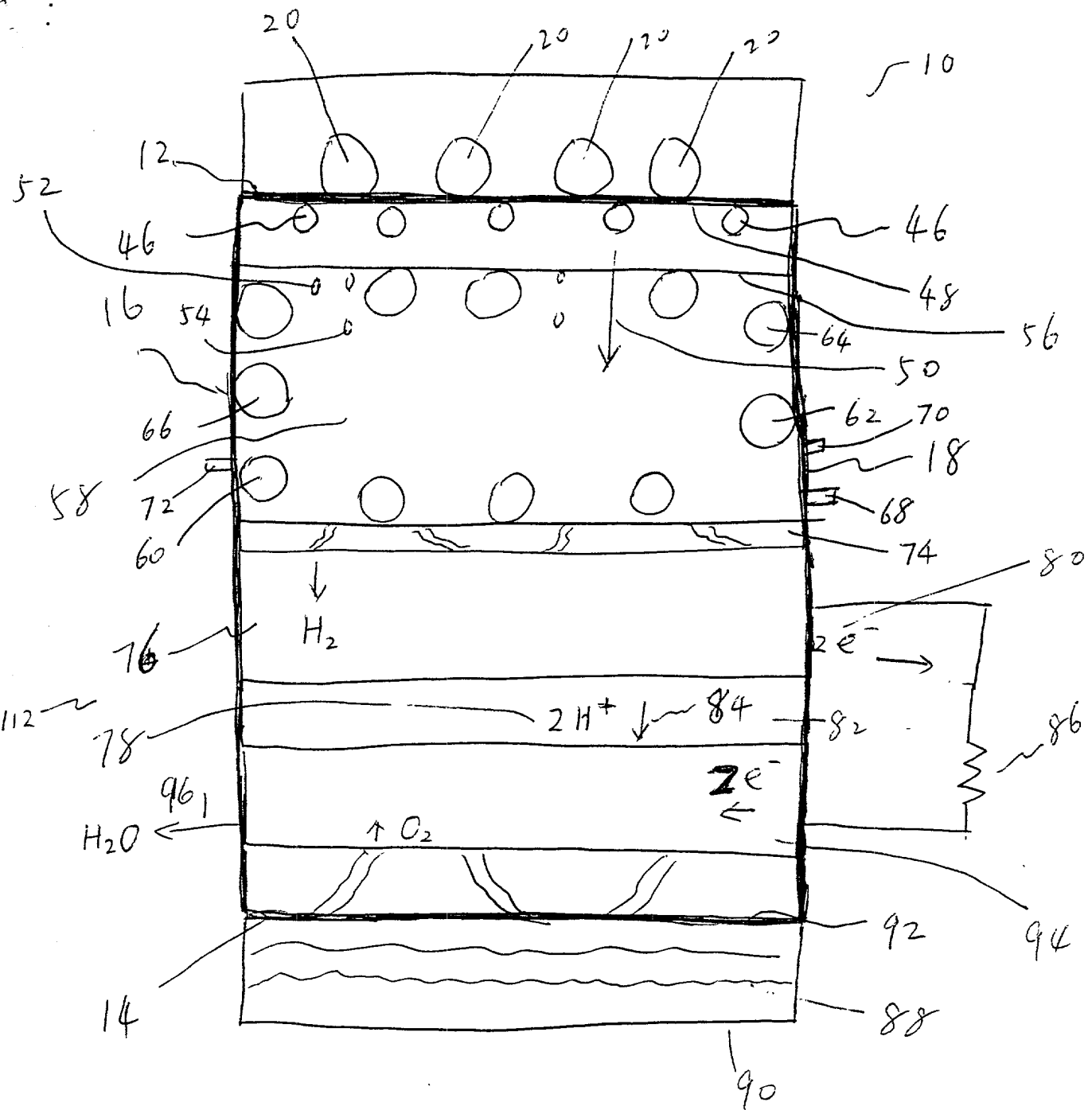


FIGURE 1

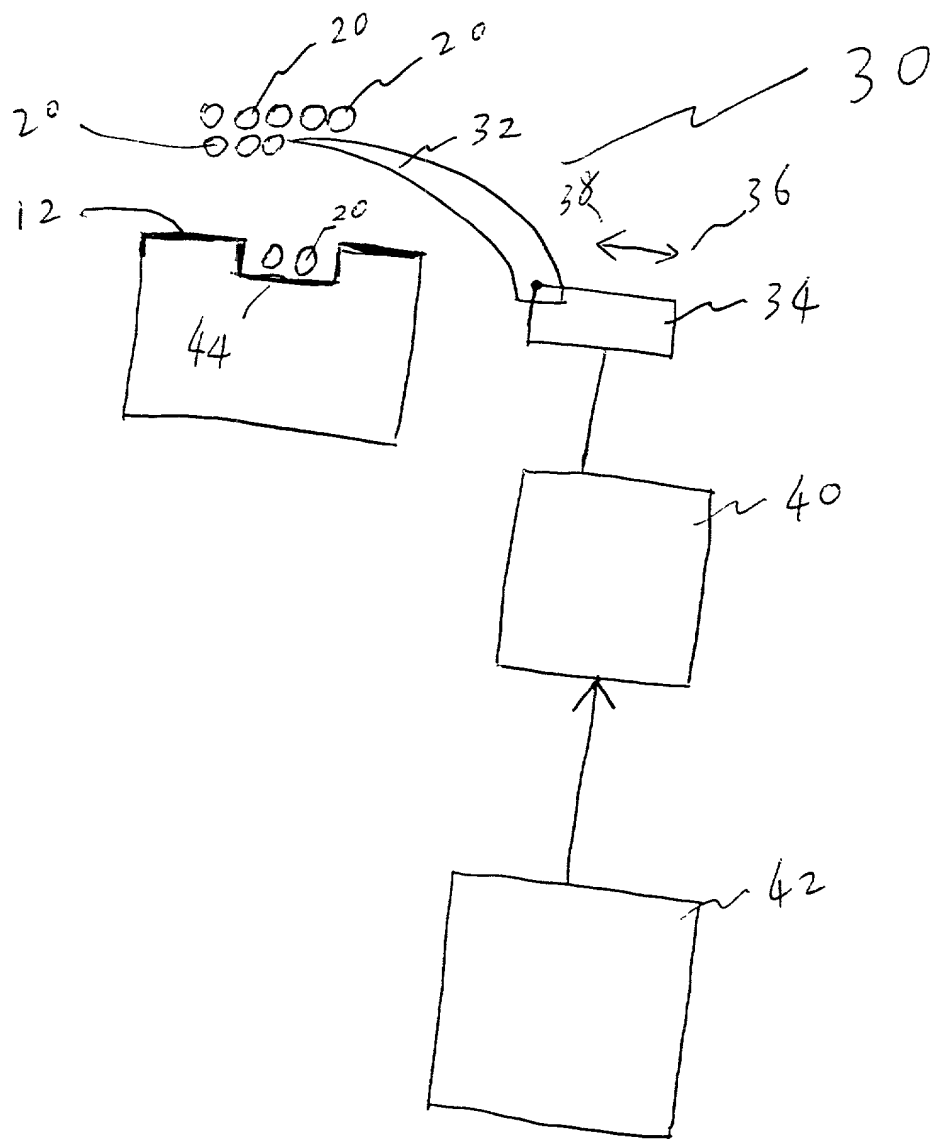


FIGURE 1A

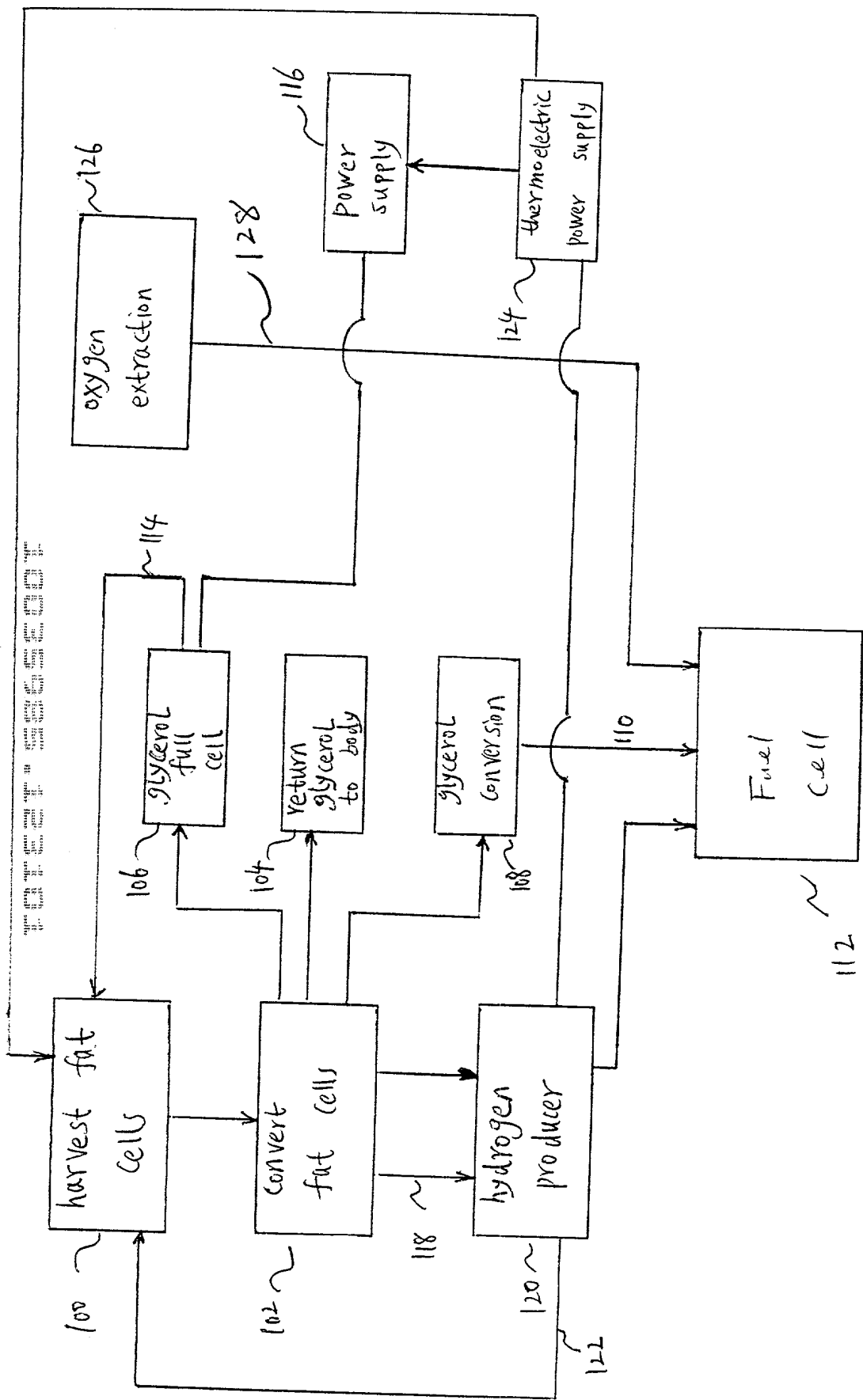


FIGURE 2

112

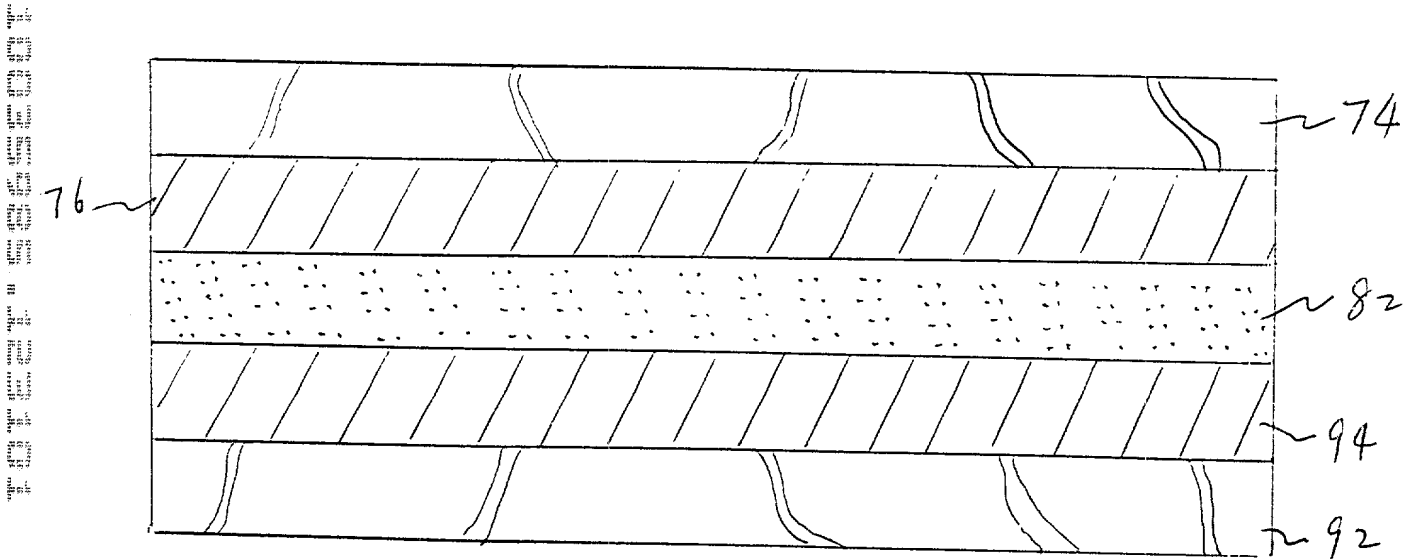


Figure 3

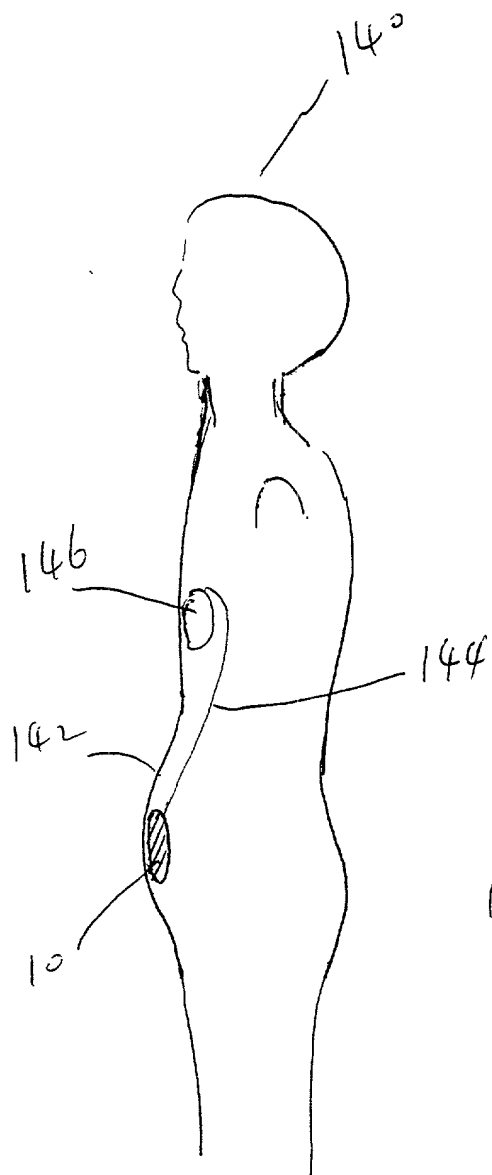


FIGURE 4A

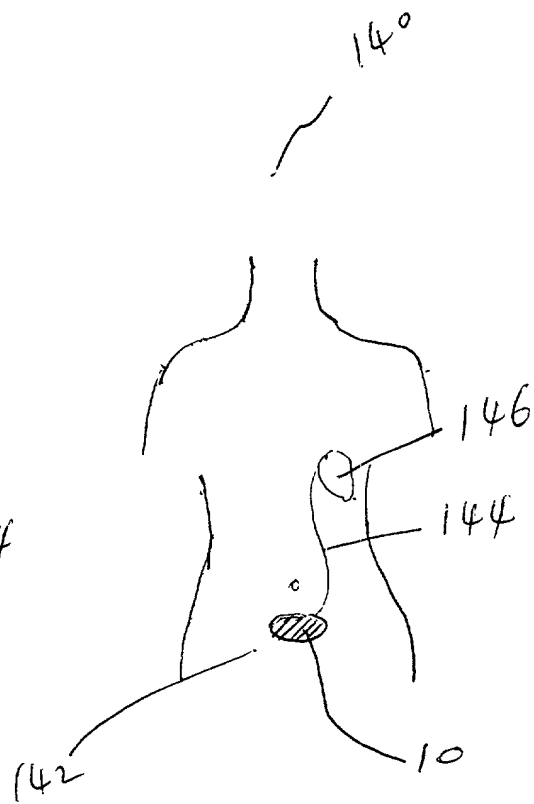


FIGURE 4B

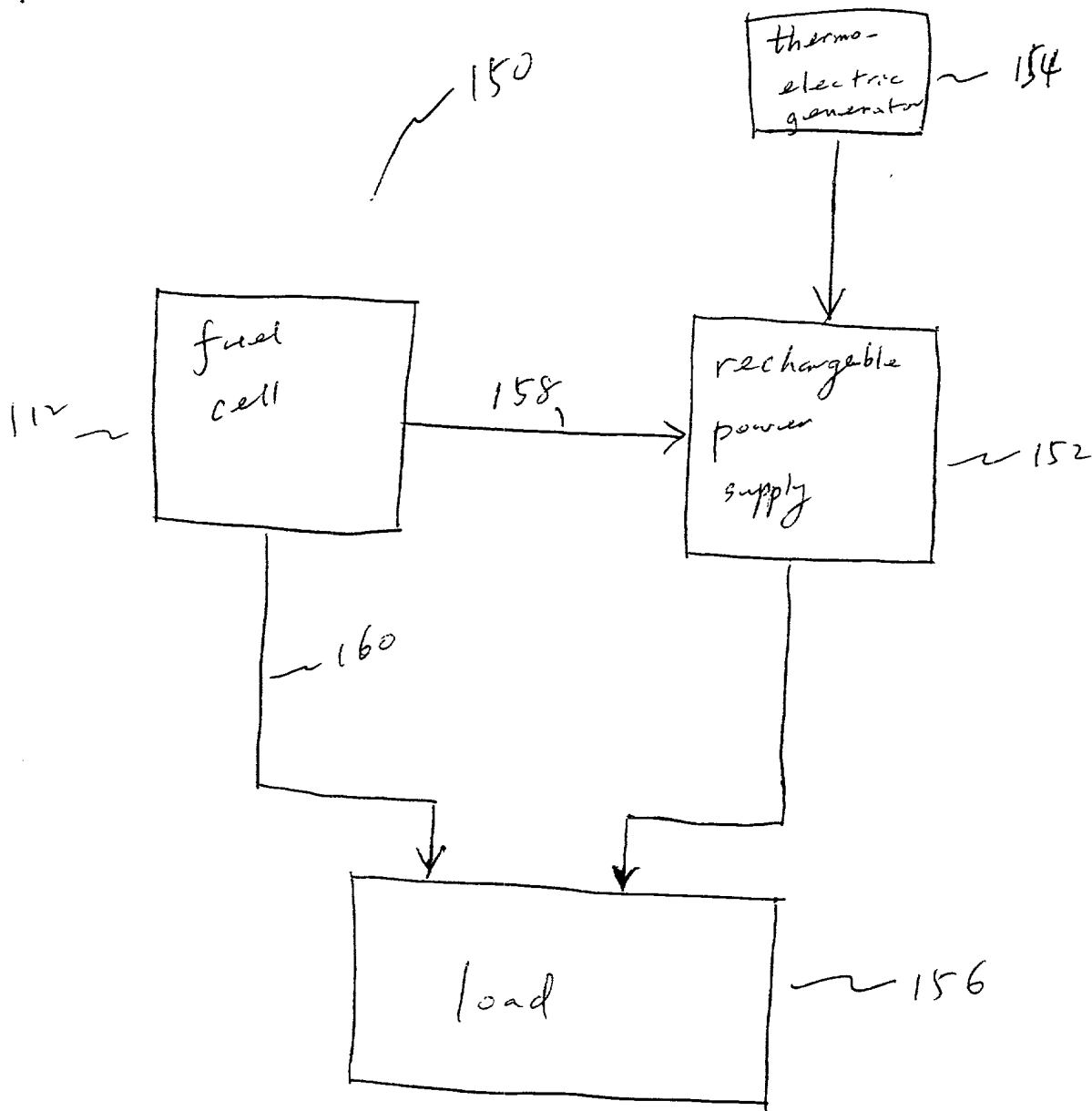


FIGURE 5

FIG. 6 is a schematic diagram of a power system 170. The system includes a fuel cell 112 and a thermoelectric generator 154. The fuel cell 112 is connected to a switch 174. The thermoelectric generator 154 is connected to a switch 176. Both switches 174 and 176 are connected to a common bus 172. The bus 172 is connected to a series of capacitors 180, 182, and 184. The capacitors are connected to a load 186. The system is powered by a source 178.

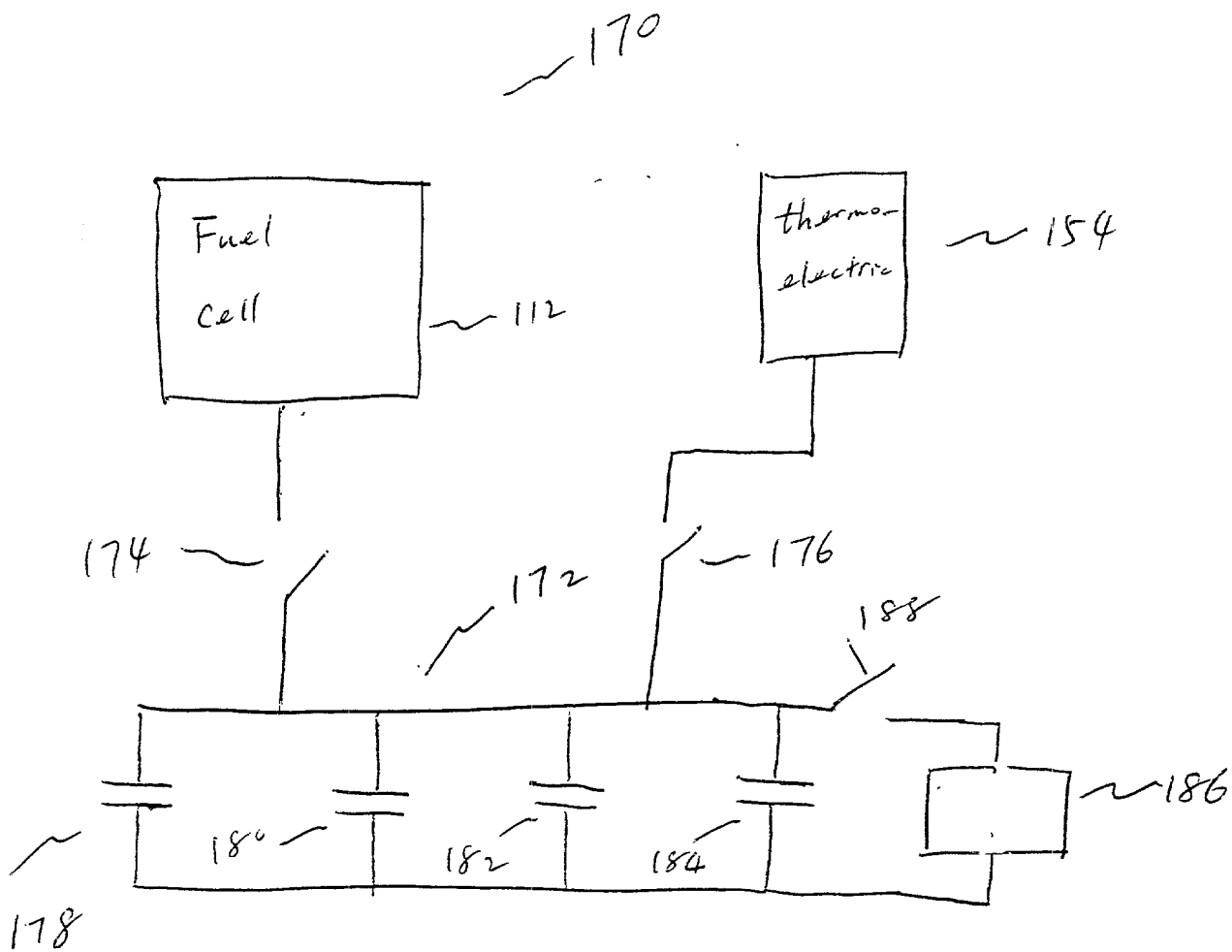
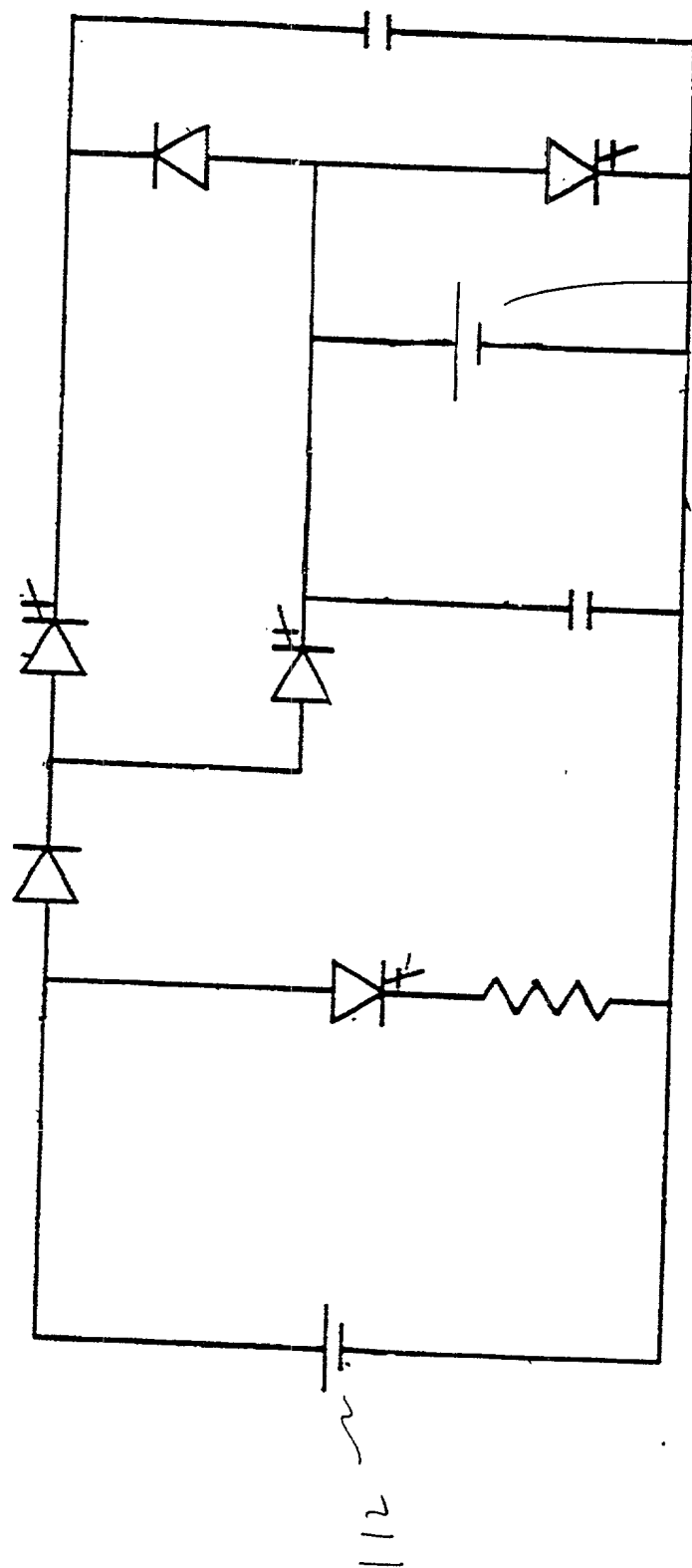


FIGURE 6



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FIGURE 1